U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-341
License No:	NPF-43
Report No:	50-341/97004(DRS)
Licensee:	Detroit Edison Company (DECo)
Facility:	Enrico Fermi, Unit 2
Location:	6400 N. Dixie Hwy. Newport, MI 48166
Dates:	March 10-14 and May 12-16, 1997
Inspector:	R. Glinski, Radiation Specialist
Approved by:	Gary L. Shear, Chief, Plant Support Branch 2 Division of Reactor Safety

Report Details

R1 Status of Radiation Protection and Chemistry (RP&C) Controls

R1.1 Overall Radiation Protection Performance and Self-Assessments for Outage and Post-Outage Work

a. Inspection Scope (83750)

The inspector reviewed representative post job ALARA reviews, radiation exposure data, and self-assessments from the 1996 refueling outage (RFO5). The inspector also reviewed exposure data for post-outage work and interviewed radiation protection (RP) staff regarding overall plant RP performance.

b. Observations and Findings

The RP staff conducted several post job ALARA reviews which identified RFO5 successes and areas of improvement. The inspector noted that post job ALARA reviews for the higher dose jobs were comprehensive and were prepared in accordance with station procedures. In particular, the reviews identified the following problems: (1) inappropriate sequence for installation of temporary lighting and shielding, (2) mechanical failures and miscommunication associated with reactor vessel disassembly, and (3) significant underestimate of the time required to install the scaffolding and the new cables for the position indicating probe replacement project. The post job reviews also noted that the reduced dose rates, which were due to source term reduction and temporary shielding, contributed significantly to the historically low outage dose.

In addition, the RP staff conducted several self-assessments regarding RP performance for a variety of RFO5 activities. These assessments identified the following issues: (1) radwaste staff was challenged by the anonymous placement of inappropriate items in the radwaste streams, (2) the installation of unnecessary scaffolding, (3) re-installation of scaffolding, (4) the need to install temporary lighting prior to temporary shielding, and (5) inadvertent removal of chains for temporary shielding from the drywell. The RP staff also identified refuel floor communication problems regarding scheduling of internal visual vessel inspection and mechanical problems with the bridge and stud detentioners (despite preventative maintenance conducted just prior to RFO5) that resulted in extra dose. However, RP staff quickly addressed these problems and the associated dose was below 1 rem.

The self-assessments also acknowledged the success of remote dosimetry and cameras, temporary shielding in the drywell, source term reduction, radwaste reduction initiatives, and the implementation of the previous outage lessons learned. RP staff estimated the following dose savings that resulted from these various initiatives:

Lessons learned from RFO4	4.7 rem
Temporary shielding (34,000 lbs)	19.8 rem
Source term reduction program	42.5 rem
TEDE ALARA evaluations for respirator use	5.0 rem

The original dose goal for RFO5 was 170 rem, but the actual dose was approximately 129 rem which was reasonable considering the work accomplished. The primary contributor to the dose savings was the source term reduction program. In this program, the licensee has installed control rod blades with reduced stellite content, replaced admiralty brass condenser tubes, replaced numerous stellite-containing valves, and improved the plant water quality. In addition, the licensee initiated injection of depleted zinc oxide in July 1995. The RP gamma spectrometry analysis demonstrated that the cobalt-60 content of the corrosion film decreased by 27% from RFO4 to RFO5, and the dose rates correspondingly decreased by 24%.

The licensee also conducted a survey of the BWR Radiation Assessment and Control (BRAC) points. This industry survey, which determines the dose rate at four points located on recirculation suction and discharge piping, indicated that RFO5 dose rates were slightly below the RFO3 dose rates. Other surveys demonstrated that the dose rates on all the nozzle discharge risers were below the RFO3 levels. In addition, the inspector observed that the general area dose rates undervessel were less than 10 millirem per hour (mR/h), which was very low.

Other RFO5 data indicated that RP controlled plant radiological conditions effectively. The personnel contaminations were below the RFO5 goal and skin dose assignment was less than 1.7 rem. Extremity dose assignment based on multiple dosimeters was 8.1 rem. All these indicators were reasonable considering the work accomplished.

In addition to outage work, the inspector also reviewed RP performance for post-outage work on motor operated valves (MOVs) and the reactor water cleanup unit (RWCU) seal replacement. Due to the reduced time for torque switch and pinion work on over 70 MOVs in the reactor building and the drywell, the actual dose for the MOV work was less than 75% of the dose estimate. RP initiatives to keep the dose ALARA included; the use of well-trained and experienced workers, moving components to low dose areas, comprehensive pre-job briefings on RP expectations, initiating the work on low dose reactor building MOVs and progressing to the higher dose drywell MOVs, and temporary shielding on some higher dose MOVs.

However, the licensee did not meet the original dose estimate for the north RWCU seal replacement, as the actual radiation dose (2.14 rem) was nearly double the original estimate of 1.16 rem. Plant personnel experienced problems removing the impeller and were required to transport RWCU components to the hot machine shop for disassembly. The extra dose due to the impeller problems was estimated at

approximately 500 mrem. In addition, the effective dose rate for the north RWCU work (26 mrem/h) was nearly 40% higher than the original 19 mrem/h estimate. In accordance with procedure, the RP staff conducted a job progress ALARA review and based on new information revised the dose estimate to 2.53 rem.

c. Conclusions

Radiological controls were effective in maintaining outage and post-outage dose ALARA. The inspector noted that the post job ALARA reviews and RP self-assessments were thorough in identifying areas of improvement for dose control measures.

R1.2 Implementation of the Declared Pregnant Woman (DPW) Program

The inspector reviewed licensee procedure MRP10, Rev. 1, "Fetal Protection Program", interviewed an RP engineer, and reviewed radiological data regarding the implementation of the program. The licensee procedural and administrative dose limits for those in the program were in compliance with 10 CFR 20 requirements. Dosimetry records indicated that individuals who were trained on the program received radiation doses well below the regulatory and administrative limits. The inspector concluded that the licensee effectively implemented the DPW program.

R1.3 Radiological Conditions and Controls of the Fermi 1 Facility

a. Inspection Scope (83750)

The inspector reviewed data and interviewed staff regarding the radiological conditions and controls for the Fermi 1 facility. The inspector also conducted a walkdown and an independent gamma survey of the facility.

b. Observations and Findings

Access to Fermi 1 was prohibited by building walls or a security fence with locked gates, and the keys were controlled by the RP department. The fenced area was posted as a radiologically restricted area (RRA). The inspector walked down portions of the Fuel and Repair Building and the reactor building and noted that the entrances and various areas within these buildings were properly posted. Access points to the reactor building basement and the hot cell cover were also conspicuously posted.

The RP survey data indicated that the readily accessible portions of these buildings were not contaminated and the radiation levels were at or slightly above background. Survey measurements taken by the inspector throughout these buildings were consistent with licensee data. The inspector observed that the decay pool, the cut-up pool, and the sample hood were posted and marked off as contaminated areas. However, these surveys have not been updated for about 20 years.

During this inspection, licensee staff found an unlocked hatch outside the Fermi 1 fence which provided access to the south compartment of the east sodium gallery. This underground gallery contained secondary sodium piping and cable trays, neither of which were contaminated. The licensee locked the hatch later that same day. Based on observations and radiation surveys within the gallery, the Fermi 1 director determined that this unlocked hatch did not constitute unsecured access to the Fermi 1 RRA. The inspector interviewed staff, reviewed the photographs and the evaluation, and concluded that this determination was appropriate.

c. Conclusions

Radiological conditions and access to the Fermi 1 facility were adequately controlled.

R1.4 Transportation of Radioactive Materials

a. Inspection Scope (86750, TI 2515/133)

The inspector reviewed the licensee's radioactive material (RAM) transportation program. This review included an assessment of training and qualifications of personnel, transportation of low specific activity (LSA) material and surface contaminated objects (SCO), expansion of the radionuclide list, changes in radioactivity limits, and the use of international system (SI) units.

b. Observations and Findings

Department of Transportation (DOT) and NRC regulations pertaining to the transportation of RAM were significantly changed on April 1, 1996. The inspector noted that the licensee's training program addressed the updated DOT and NRC regulations and was effectively implemented. Several members of the licensee's staff successfully passed a 1996 vendor-supplied training course detailing the regulatory changes. The names of the individuals authorized to approve RAM shipments and to review shipping papers were documented in a licensee memorandum. In addition, deconners, RPTs, and Quality Assurance staff also attended this course or received applicable training onsite. Overall, the RAM shipping personnel were very knowledgeable of transportation processes and the updated regulations.

The inspector reviewed the licensee's procedures for transporting LSA and SCO materials. The RP staff had revised the shipping procedures and then submitted the revisions to a RAM shipping vendor to ensure regulatory compliance. The inspector noted that the revised procedures reflected the regulatory changes. The licensee did not have a procedure for the characterization and shipping of LSA-III material and had no plans to ship LSA-III. If this need arises, the licensee will either develop the procedures or contact a qualified vendor.

The inspector reviewed the shipping papers associated with the only SCO shipment completed by the licensee and verified that the determination of SCO-I and SCO-II

were based on current A_1 and A_2 values. No problems were identified with this shipment. The inspector also reviewed shipping papers associated with representative LSA, limited quantity, and Type A shipments. The inspector noted that the shipping papers contained the proper information regarding waste classification, reportable quantity, physical and chemical form, radiation levels, emergency response information, volume, weight, total activity (in SI units), the 95% rule for listing nuclides, and were signed by authorized personnel.

The radwaste personnel possessed the current table of A_1 and A_2 values for the expanded list of radionuclides to ensure that packages would not exceed their allowable quantities. The inspector independently selected A_1 and A_2 values generated from the licensee's computer (cobalt-60, zinc-65, cesium-137, rubidium-86, neptunium-239, and plutonium-241) and verified that the new values were utilized. The inspector observed the staff retrieve the values and produce the appropriate shipping papers.

A Fermi 2 radiological principal engineer conducted a self-assessment regarding the implementation of the new RAM transportation regulations. The assessment was thorough, based on observations, and identified one minor area for improvement related to package surveys. The inspector also noted that, when applicable, the licensee utilized the equivalent of NRC Forms 540, 540A, and 541 for RAM shipments. The activities of tritium, carbon-14, technecium-99, and iodine-129 for waste shipments were listed as required by 10 CFR 20, Appendix G.

c. Conclusions

The inspector noted that training for and implementation of the new transportation regulations were effective.

R1.5 Solid Radioactive Waste Management

a. Inspection Scope (86750)

The inspector reviewed the solid radioactive waste program including storage, processing, and the conduct of radwaste operations. The inspector performed walkdowns and radiological surveys of the On Site Storage Facility (OSSF), storage areas for low level RAM outside the RRA, various waste tank rooms, and the radwaste control room. The inspector also reviewed selected documents and interviewed various radwaste personnel.

b. Observations and Findings

The inspector observed that RAM stored in the OSSF was appropriately marked and labeled. Confirmatory surveys determined that radiation levels indicated on RAM tags were appropriate. Continuous air monitoring and filtered ventilation were used to detect and mitigate any airborne contamination. The radwaste staff conducted a weekly visual inspection of stored RAM using remote cameras mounted throughout the OSSF. In addition, radwaste staff conducted periodic inspections of drums and

high integrity containers (HIC) by lifting the containers with the overhead crane, accompanied by a close examination of the container with OSSF cameras. The inspector observed a monthly drum survey and a simulation of the weekly visual inspection of the OSSF and noted that radwaste staff conducted the OSSF survey in accordance with procedure. The weekly OSSF survey was effective as shown by the recent identification of a leaking HIC which contained charcoal with low level contamination. The radwaste staff then transferred the material from the leaking HIC to another container.

The licensee stored low level RAM in several areas outside the RRA. The inspector observed the RAM stored in Warehouse B, the north and south quonset huts, and several seavans located east of the OSSF. The RAM was properly controlled and labeled. The licensee surveyed the RAM outside the RRA quarterly as part of the Performance Scheduling and Tracking program. The inspector also walked down several tank rooms utilized for storing and processing radwaste and noted that the material condition was excellent. The observed tanks were the centrifuge feed, the waste clarifier, the spent resin, the condensate phase separator, the floor drain, the waste surge, and the evaporator feed surge tank.

The Updated Final Safety Analysis Report (UFSAR) stated that resin could be dewatered or solidified on site. No solidification was occurring on site; however, the licensee maintained the equipment to conduct this process. A vendor representative operated the vendor-supplied dewatering equipment for spent resin on site prior to shipment. The dewatering process and the use of various HICs were performed in accordance with vendor procedures, which were approved and controlled by the licensee.

The licensee had been denied access for offsite burial from July 1990 to June 1995, and had therefore accumulated a large radwaste inventory. The opportunity to resume shipping radioactive waste to offsite burial and incinerator facilities became available in June 1995. Since that time, the radwaste group has taken action to reduce the inventory of radwaste stored onsite. In 1996, the staff made 9 shipments of spent resin and sludge (2340 cubic feet), 49 shipments of dry active waste (DAW (2990 cubic feet), and 5 shipments of irradiated components (131 cubic feet). The following table summarizes the current status of solid radwaste for 1997, including radwaste to be shipped before July 1997 (all volumes in cubic feet):

Waste Type	Stored Onsite	Shipped	To Be Shipped
DAW, Incinerable, Compactible	5465	6083	0
Spent Resins, Sludge	5025.5	1571	4910
Various metals	359	10872	0
Filter media	1773.4	0	250.4

The radwaste staff have identified twelve drums with unknown content. There has not been a formal program to examine these drums, but the staff have begun to develop plans to characterize the contents. In addition, there were 30 drums with cement and water from OSSF and turbine building modifications, and radwaste staff have begun to pursue several disposal options.

c. Conclusions

The inspector determined that the licensee's implementation of the solid radwaste process, storage, and shipping program was successful.

R1.6 Solid Radioactive Waste Classification

a. Inspection Scope (86750)

The inspector interviewed staff and reviewed the licensee's procedures and documentation which controlled the sampling and analysis to ensure compliance with 10 CFR 61 requirements for determining waste classification.

b. Observations and Findings

The licensee's program involved the periodic collection of samples to characterize wet homogeneous solid wastes, DAW, and filter media. The samples were taken annually, and new samples would be taken if changes in water chemistry or other operational problems occurred which could change the radiological content of the radwaste. A reactor coolant gamma analysis was performed weekly and if the cesium-137/cobalt-60 ratio changed by a factor of ten for two consecutive weeks, the licensee would sample the RWCU spent resin for further 10 CFR 61 analyses. Plant history indicated that crud bursts did not alter the radiological content of plant waste. The 10 CFR 61 samples were analyzed by a vendor laboratory to quantify the radionuclides present and generate isotopic ratios (scaling factors) for quantifying the difficult to measure isotopes.

The inspector reviewed the licensee's most recent scaling factor determination. The cobalt-60 (Co-60) content for DAW changed from 69% to 5.1% in April 1996. This Co-60 decrease resulted in large changes in the iron-55, manganese-54, and Co-58 content of DAW. There were also large changes for strontium-90 in RWCU and fuel pool resin and chromium-51 in RWCU resin. These changes were attributed primarily to the recently initiated zinc injection, which has been shown to alter Co-60 and Cr-51 behavior in reactor coolant. The inspector determined that the licensee's assessment of these changes was appropriate. In addition, the inspector noted that the RP staff determined the tritium content from E-BAR analysis in accordance with station procedure.

The inspector reviewed the station program to determine the radioactivity content of RAM shipments. To determine the total radioactivity in spent resin for RAM shipments, samples were taken from each batch resin. The sample was obtained

by the use of an isolok sampler which performed ten sampling cycles during the recirculation of a holding tank. The gamma spectrometry was conducted by the chemistry laboratory and the key nuclides (cobalt-60, cesium-137, and cerium-144) designated to establish scaling factors for difficult to measure nuclides were used to determine the activity of all the nuclides for the shipment. For DAW, the radwaste staff conducted a dose-to-curie analysis using commercial software and the DAW scaling factors. The inspector noted that the software was periodically verified by hand calculations.

The inspector also reviewed the lower limits of detection for the difficult to measure nuclides and determined that they met the guidance in the NRC's "Final Waste Classification and Waste Form Technical Position Papers."

c. Conclusions

The licensee's program to determine radionuclide scaling factors was effective, and enabled the staff to appropriately classify waste for RAM shipments. These activities met regulatory requirements.

R2 Status of RP&C Facilities and Equipment

R2.1 Calibration and Function Checks of Radiation Detection Instrumentation

a. Inspection Scope (83750)

The inspector reviewed the UFSAR, calibration records, and quality control activities for various RP survey meters, monitors, and counting room instrumentation. The inspector also interviewed personnel primarily responsible for calibrations and observed the calibration and counting room facilities.

b. Observations and Findings

The inspector observed that the types and quantities of survey meters possessed by the licensee exceeded the UFSAR requirement. A review of calibration records demonstrated that the calibrations of the radiation detection instruments were conducted in accordance with station procedures. Most survey meters were calibrated with a TL Shepard Model 89 calibrator, but the neutron monitoring meters were sent to the manufacturer. The inspector noted that the staff responsible for survey meter calibrations were experienced and knowledgeable. The calibration facility was well maintained and out-of-service meters were physically segregated to prohibit their use. Throughout this inspection, all the instruments observed in the plant were within calibration.

The inspector noted that the functional checks for the various radiation detection instruments were performed according to station procedure. Functional checks for most of the fixed monitors were conducted with a source having activity comparable to the alarm set points (12,000 dpm), ensuring that the instrument would alarm as required. The inspector observed function checks for the tool

monitor and a personnel contamination monitor at the RRA access, and the results were acceptable.

The RP counting room instrumentation was calibrated with sources traceable to the National Institute for Standards and Testing (NIST). This instrumentation was regularly used to count air samples and smears collected throughout the plant. The inspector noted that the quality control for the gamma spectrometry system included monitoring of the check source activity, centroid, and full width-half maximum. The gamma spectrometry control charts indicated that these systems have remained within statistical control.

The gas-flow proportional counter control chart for alpha counting indicated stable performance, but the beta control chart indicated a low bias. This low bias could result in a non-conservative assessment of radiological conditions within the plant. The RP manager stated that the gas-flow counter performance would be reviewed and during the latter portion of the inspection the low bias was corrected.

Interviews with the RP staff indicated that there have been infrequent operability problems with the radiation detection instrumentation. The inspector did not observe any material condition problems.

c. Conclusions

The calibration and functional check program for radiation detection instrumentation was effectively implemented. The performance history of the instruments indicated that the overall operability has remained excellent. A low bias for beta counting on the gas-flow proportional counter was identified and corrected.

R4 Staff Knowledge and Performance in RP&C

R4.1 Radiological Testing and Preparation for the Hydrogen Water Chemistry (HWC) Implementation

a. Inspection Scope (83750)

The inspector reviewed radiological data, interviewed staff, and conducted a walkdown of the reactor, auxiliary, and turbine buildings regarding the testing and preparation for HWC implementation.

b. Observations and Findings

The licensee conducted radiological surveys at 86 locations onsite and offsite during the initial HWC testing. To assess the dose impact of the resultant nitrogen-16 in the steam, dose rate readings were taken at hydrogen injection rates ranging from 0-80 standard cubic feet per minute (scfm), in increments of 10 scfm. The plant has planned to operate HWC at 70 scfm to achieve a dissolved oxygen concentration of less than 2 parts per billion in the reactor water. Review of the data indicated that at 70 scfm the radiation dose rates for steam-affected areas increased six-fold.

The HWC testing at 70 scfm revealed that the radiological postings would be upgraded in several areas. The turbine building roof changed from a radiation area to a high radiation area and the east hallway of the turbine building near the condensate recirculation lines was upgraded to a radiation area, as were the condensate filter demineralizer valve rooms and the off gas recombiner rooms.

The RP staff have taken steps to control radiation dose from HWC. A locked gate was placed on a stairway leading to the third floor of the turbine building and the turbine roof/crane(locked high radiation area), and locked gates were installed to prevent access to the condenser pumps (high radiation area) in the turbine building basement. Other measures were the installation of a remote control for operating the turbine building crane, the procurement of cameras and remote radiation monitors to increase the remote monitoring of equipment during operator rounds, and installation of lead blankets in front of the offgas oxygen analyzer rack. The licensee has also planned to decrease power periodically, at which time the operators may conduct rounds when dose rates are lower.

Due to the increased dose rates, additional lead shielding was placed alongside and under the hand/foot monitors located outside the control room. The RP staff closely monitored the background for the personnel contamination monitors located at the RRA access and the protected area portal, and did not identify a measurable increase. The access portal is the storage location for personnel dosimetry and the control dosimetry (for background subtract of personnel dosimetry). Since the dose rates at the access portal did not show a measurable increase, the RP staff does not anticipate the need to alter the personnel dosimetry background dose determination. However, the NRC will continue to review this matter to ensure that the background subtract for personnel dosimetry is appropriate.

The surveys showed that dose rates at the Availability Improvement Building will increase several-fold and RP staff estimated that the collective site dose for 1997 would increase by approximately 5 rem. Due to the increased dose rates for various administrative areas of the site, the licensee has classified all workers permanently assigned to the site as either limited or full radworkers and the administrative dose limit for the limited radworkers was raised from 100 millirem per year (mrem/yr) to 500 mem/yr. The RP staff developed and presented to all site personnel training on the chemical and radiological impact of HWC on plant operations.

The material condition of the zinc injection skid, the hydrogen injection rack, and the oxygen injection rack were excellent.

c. Conclusions

Testing for the chemical and radiological impact of HWC was well planned and implemented. The RP staff adjusted the radiological postings and trained site staff appropriately. Although survey data indicated that the storage location for control dosimetry was unaffected by HWC, NRC will continue to monitor the background subtraction for personnel dosimetry.

R4.2 ALARA Practices for Loading a High Integrity Container into a Transportation Cask

a. Inspection Scope (86750)

The inspector attended a pre-job briefing and observed various activities associated with the transfer of a HIC from an OSSF storage bay to a transportation cask.

b. Observations and Findings

The inspector observed preparations for the 97-061 RAM waste shipment of spent resins in a HIC. The pre-job briefing covered expected radiation dose rates, tool staging, required dosimetry, communications during the activities, cask inspections, and contingencies for OSSF crane failure. Prior to the movement of the HIC from the storage bay to the truck bay, radwaste personnel made calls to the RP desk and the site control room. Subsequent notification was made over the paging system to alert all plant staff of the activities. Radwaste personnel transferred the HIC into the shipping cask by the use of the OSSF crane and cameras. The cameras were used during the transfer to enable staff to remotely verify that the classification, LSA markings, waste volume, and material condition of the HIC were acceptable.

Dose rate and smear surveys of the cask before and after the insertion of the HIC were conducted. The staff inspected the gasket of the cask and conducted a minor repair with silicone adhesive. The inspector noted that the procedure and checklist for this shipping cask was available in the truck bay for use, and that plant staff conducted this task in accordance with procedure.

c. Conclusions

The transfer of a spent resin HIC from an OSSF storage bay to the transportation cask was well organized. The extensive use of remote control enabled the site to conduct radwaste operations while expending minimal radiation dose.

R7 Quality Assurance in RP&C Activities

R7.1 Quality Assurance for Personnel Dosimetry and Whole Body Counting

a. Inspection Scope (83750)

The inspector reviewed quality control (QC) records for both thermoluminescent dosimeters (TLD) and the whole body counters (WBC), and interviewed RP personnel regarding the overall quality of the internal and external dose assessments.

b. Observations and Findings

The inspector verified that the Fermi 2 dosimetry program was in compliance with the UFSAR. The TLDs used for personnel dosimetry were processed onsite and the station has maintained its National Voluntary Laboratory Accreditation Program

accreditation for TLD dosimetry for the applicable portions of Categories I-IX through September 1997.

The inspector reviewed the licensee's TLD quality control data. The program consisted of a semi-annual analysis of TLD badges exposed to known quantities of radiation by independent laboratories. The acceptance criteria was 50% of the American National Standards Institute (ANSI) N13.11-1993 tolerance limit. Nearly all of the results were within this administrative limit, while all the results were within the ANSI limit.

The QC program for personnel dosimetry analysis also involved monitoring individual TLD badges for the correction factor, element ratios, and percent coefficient of variance (%CV). All these results were within the acceptance criteria. In addition, the staff analyzed badges spiked onsite with every batch of TLDs. The spiked badges were exposed to known radiation doses with a Williston-Elin TLD Irradiator, Model WE 2001-PC. The inspector verified that the WE 2001-PC was calibrated through an independent, secondary source traceable to NIST and the most recent test indicated that the WE 2001-PC was within 1% of the NIST source.

The WBCs were calibrated with NIST traceable sources positioned within a BOMAB (Bottle Mannequin Absorber) phantom. The current calibrations were comparable to the previous calibrations, indicating that the WBCs have remained stable. The inspector noted that both functional and background checks were performed as specified, and that peak location, peak width, and nuclide activities (cobalt-57, 60 and cesium-137) were monitored. The control chart data indicated that the WBCs have remained within statistical control.

The inspector reviewed several internal dose assignments based on WBC data. The WBCs detected radionuclides at levels comparable to the calculated lower limits of detection. The licensee utilized commercial software to perform internal dose assignments based on the WBC data and RP staff stated that representative internal dose assessments have been confirmed by manual calculations. The collective internal dose assignment for RFO5 was less than 10 mrem.

The individuals that analyze TLD dosimetry were required to pass an annual competency test and the inspector verified that the three individuals who currently operated the system had recently passed this test. The inspector did not observe any material condition concerns regarding the dosimetry or WBC instrumentation.

c. Conclusions

The licensee continued to maintain its accreditation and the QC program effectively ensured proper external dose assignments by TLD. The WBC QC program and internal dose assessments were well implemented and indicated that plant operations have resulted in minimal internal radiation dose assignments.

R7.2 Self-Assessments and Audits of RP&C Performance

a. Inspection Scope (86750)

The inspector reviewed two self-assessments and two Nuclear Quality Assurance (NQA) audits regarding RP and radwaste performance.

b. Observations and Findings

The RP department performed two self-assessments regarding the solid radwaste program. A radiological principal engineer assessed the implementation of the new shipping regulations and the efforts to reduce the generation of radwaste.

Regarding the reduction of radwaste, a weakness was observed with personnel accountability regarding the appropriate segregation of waste. Radwaste staff were placed at RRA control points during the start of the outage to intercept unnecessary material from entering the RRA to aid in radwaste reduction. In addition, the General Supervisor Radwaste distributed a memorandum prior to the outage which outlined to plant staff several guidelines to reduce the generation of radwaste. However, inappropriate, unused, and partially used material was often placed anonymously into the waste stream to be evaluated for free release. This was partially caused by plant staff who cleaned a work area by placing various items (such as tools, grease, and hoses) into waste containers or areas. Although this practice challenged the radwaste staff, the volume of radwaste generated during the outage was less than 65% of the outage goal. The licensee has begun to develop plans for greater control and accountability for this process, with an emphasis on providing workers with only the amount of material needed for each job and by requiring workers to provide an accurate history of various supplies submitted for evaluation.

The NQA audit of radwaste operations identified two minor problems. The auditors noted that the temperature in the OSSF was below that specified in the UFSAR and that radwaste staff had not submitted 1994 and 1995 shipping records for archival.

The inspector noted that an NQA audit team, which included two individuals from other facilities, conducted a comprehensive review of RP performance of outage and routine activities. The audit identified issues related to recordkeeping, postings at Fermi 1, inattention to detail, and inconsistencies between various plant documents. In addition, this audit identified a problem with the RP department's inconsistent use of the site Deviation Event Report (DER) process for procedural violations. The audit noted that consistent use of the DER process by RP would enable all radworkers to learn from the experience of others and would also enhance RP's ability to identify adverse trends. The RP staff's inconsistent use of the DER process has also been identified by the NRC as an Inspection Followup Item (See Section R8.1). No significant health and safety findings were identified.

c. Conclusions

The self-assessments were comprehensive, performance-based, and identified areas for improvement. The NQA audits identified some minor problems, particularly the inconsistent use of the site DER process by RP, which had also been identified by the NRC.

R8 Miscellaneous RP&C Issues

R8.1 (Closed) Inspection Followup Item 50-341/96010-16: inconsistent use of the site DER process for RP procedural violations. Both the NRC and an NQA audit identified that RP's utilization of the DER process for RP procedural violations was inconsistent. The inspector reviewed training records which showed that RP staff had received training on DER initiation, and interviews with staff revealed a greater awareness and propensity for using the DER process. The inspector reviewed a number of DERs recently initiated by the RP department and found that a variety of RP violations were documented in the DER system. The resident staff did not detect a reluctance by RP staff to use the DER process. Due to a more consistent utilization of the DER process by RP staff, this item is closed.

X1 Exit Meeting Summary

The inspector presented the inspection results to licensee representatives during an interim exit meeting on March 14, and a final exit meeting on May 16, 1997. The licensee did not indicate that any materials examined during the inspection should be considered proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

S. Bartman, Chemistry Supervisor
J. Carter, Radwaste Supervisor
D. Craine, Radiological Engineer
L. Craine, Radiological Engineer
L. Crissman, General Supervisor, Radwaste
P. Duffy, Radiological Engineer
P. Fessler, Plant Manager
L. Goodman, Fermi 1 Director
P. Keenan, Radiological Engineer
E. Kokosky, Radiation Protection Manager
G. MacAdam, General Supervisor, Radiation Protection Operations
M. Machlik, Supervisor II
J. Oetken, Radiological Engineer
J. Stewart, Senior Science/Engineering Technician
B. Weber, Supervisor, Radwaste Shipping
D. Williams, Radiological Engineering Supervisor

NRC

G. Harris, Senior Resident Inspector, Fermi 2
C. O'Keefe, Resident Inspector, Fermi 2

INSPECTION PROCEDURES USED

IP 83750, "Occupational Exposure"
IP 86750, "Solid Radioactive Waste Management and Transportation of Radioactive Materials"
TI 2515/133, "Implementation of Revised 49 CFR Parts 100-179 and 10 CFR 71"

ITEMS OPENED, CLOSED, AND DISCUSSED

CLOSED

50-341/96010-16	IFI	Inconsistent use of the site DER process for RP procedural violations

LISTING OF DOCUMENTS REVIEWED

Updated Final Safety Analysis Report (UFSAR), Section 11.5 - Solid Radwaste System

UFSAR Section 11.7 - On Site Storage Facility

UFSAR Section 12 - Radiation Protection

ALARA Post Job Review, RWP 96-1063, "Replacement of up to 6 LPRM Detectors".

ALARA Post Job Review, RWP 96-1047, "Install and Remove Drywell Baseline Shielding".

ALARA Post Job Review, RWP 97-1058, "Reactor Vessel Disassembly in Cavity".

ALARA Post Job Review, RWP 96-1228, "PIP Replacement Project".

Self-Assessment NPRC-96-0436, "Outage Radwaste Volume Reduction".

Self-Assessment NPRC-96-0449, "Incorporating RFO4 Lessons Learned into RFO5".

Self-Assessment NPRC-96-0400, "RFO5 Gamma Scans and Trending Surveys".

Self-Assessment NPRC-97-0012, "Temporary Shielding at Fermi 2".

Self-Assessment NPRC-96-0275, "Implementation of New Shipping Regulations".

Self-Assessment NPRC-96-0436, "Outage Radwaste Volume Reduction".

Nuclear Quality Assurance, Audit Report 96-0140, "Radiological Protection Program".

NQA Audit Report 97-0108, "Chemistry, Radiological Effluents, Radioactive Material Transfer and Disposal".

Fermi 2 Dosimetry Laboratory Quality Control Manual, Rev. 2.

Whole Body Counter Efficiency Calibrations, NPRC-95-0190, dated July 8, 1995.

Stand-up Whole Body Counter In-vivo Analysis System Calibration Verification, dated June 24, 1995.

Chair Whole Body Counter Efficiency Calibration Update, NPRC-97-0041, dated February 6, 1997.

MRP03, Rev. 2, "Personnel Radiation Monitoring Devices".

MRP04, Rev. 3, "Accessing and Working in the Radiologically Restricted Area (RRA)".

MRP10, Rev. 1, "Fetal Protection Program".

Nuclear Production Operating Procedure (NPOP) 65.000.208, Rev. 8, "Cleaning and Operation of the Panasonic UD-710A Automatic TLD Reader".

NPOP 65.000.244, Rev. 5, "Standardization/Verification of the WE 2001-PC Automatic TLD Irradiator".

WE 2001-PC Automatic TLD Irradiator Standardization/Verification form, dated October 3, 1996.

NPOP 65.000.204, Rev. 8, "Dosimetry Performance Testing".

NPOP 65.000.506, Rev. 13, "Shipping Low Specific Activity (LSA) Radioactive Material".

NPOP 65.000.508, Rev. 6, "Shipping $\leq A_1, A_2$ Quantities of Radioactive Material".

NPOP 65.000.509, Rev. 10, "Shipping Greater Than A_1, A_2 Quantities of Radioactive Material".

NPOP 65.000.514, Rev. 8, "Shipping Empty Radioactive Packaging".

NPOP 65.000.515, Rev. 5, "Receipt, Storage, Inventory, Inspection, and Packing of Radioactive Shipping Packages".

NPOP 65.000.520, Rev. 6, "Scaling Factors for Radioactive Waste Assay".

NPOP 65.000.522, Rev. 0, "Radioactive Material - Surface Contaminated Object".

NPOP 65.000.523, Rev. 0, "Radwaste Shipments".

MRP21, Rev. 2, "Radwaste Shipping Operations".

MRP16, Rev. 2, "Use of the On Site Storage Facility".

MRP15, Rev. 2, "Radioactive Material Outside the RRA".

NPRC-96-0149, "Scaling Factor Comparisons".

NPRC-96-0363, "Control of Contaminated Material and Reduction of Radwaste Within the RRA"

NPRC-97-0028, "Annual Radioactive Effluent Release Report".

Fermi 2 Process Control Program Manual, Rev. 18.

Fermi 2 10 CFR 61 Compliance Program Manual, Rev. 15.

Radwaste Shipment Packages 96-096, 97-067, 97-050, 97-064, 97-063

LIST OF ACRONYMS USED

ALARA	As Low As is Reasonably Achievable
ANSI	American National Standards Institute
BOMAB	Bottle Mannequin Absorber
BRAC	BWR Radiation Assessment and Control
DAW	Dry Active Waste
DER	Deviation Event Report
DOT	Department of Transportation
DPW	Declared Pregnant Worker
HIC	High Integrity Container
LSA	Low Specific Activity
MOV	Motor Operated Valve
NQA	Nuclear Quality Assurance
OSSF	On Site Storage Facility
QC	Quality Control
RAM	Radioactive Material
RP	Radiation Protection
RRA	Radiologically Restricted Area
RWCU	Reactor Water Cleanup Unit
SCO	Surface Contaminated Object
SI	International System units
TLD	Thermoluminescent Dosimetry
UFSAR	Updated Final Safety Analysis Report